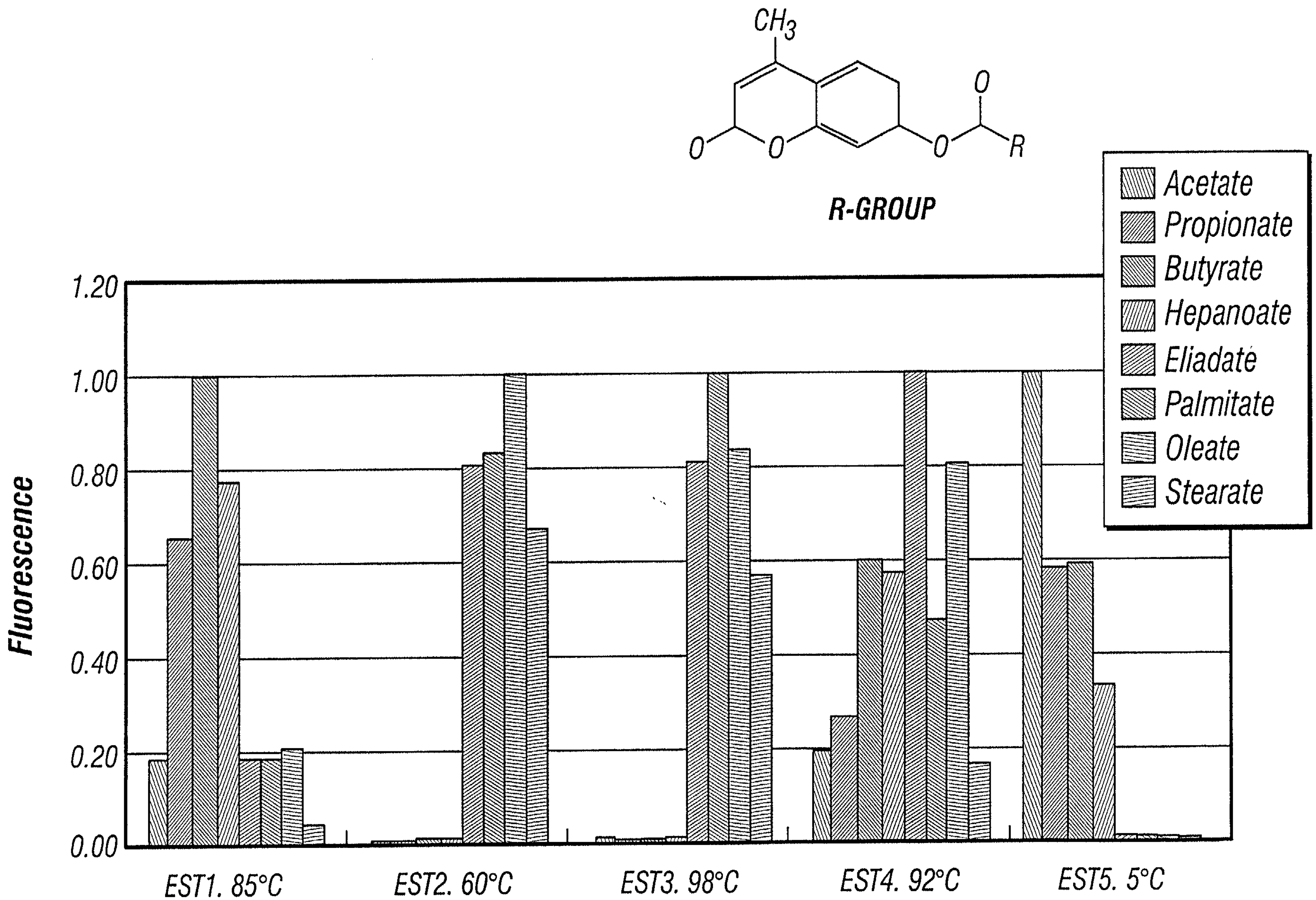

CH3
O
O
O
O
R
R-GROUP
Acetate
Propionate
Butyrate
Hepanoate
Eliadate
Palmitate
Oleate
Stearate
Fluorescence
1.20
1.00
0.80
0.60
0.40
0.20
0.00
EST1. 85°C
EST2. 60°C
EST3. 98°C
EST4. 92°C
EST5. 5°C

FIG. 1

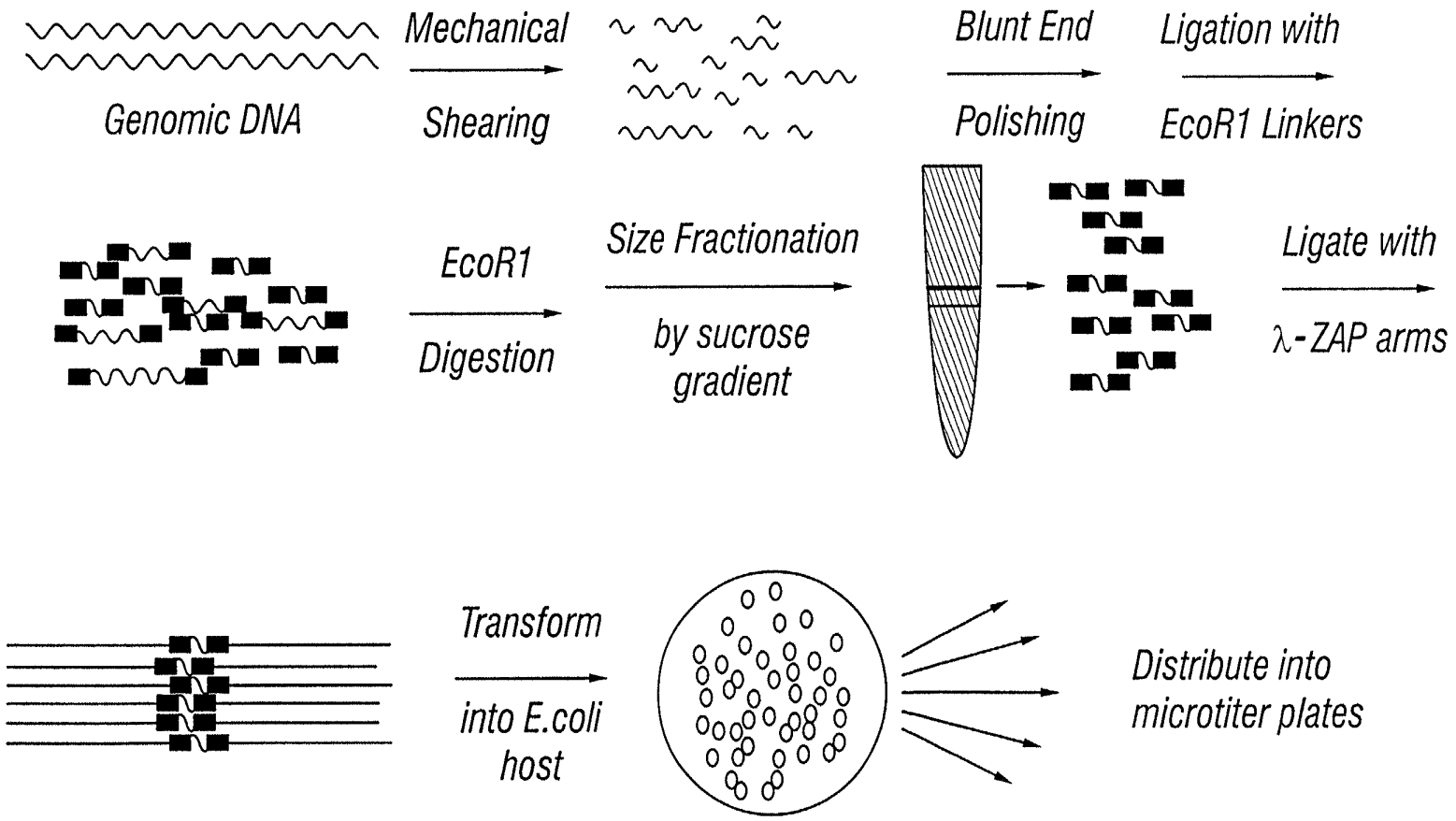

Genomic DNA
Mechanical
Shearing
Blunt End
Polishing
Ligation with
EcoR1 Linkers
EcoR1
Digestion
Size Fractionation
by sucrose
gradient
Ligate with
λ-ZAP arms
Transform
into E.coli
host
Distribute into
microtiter plates

FIG. 2

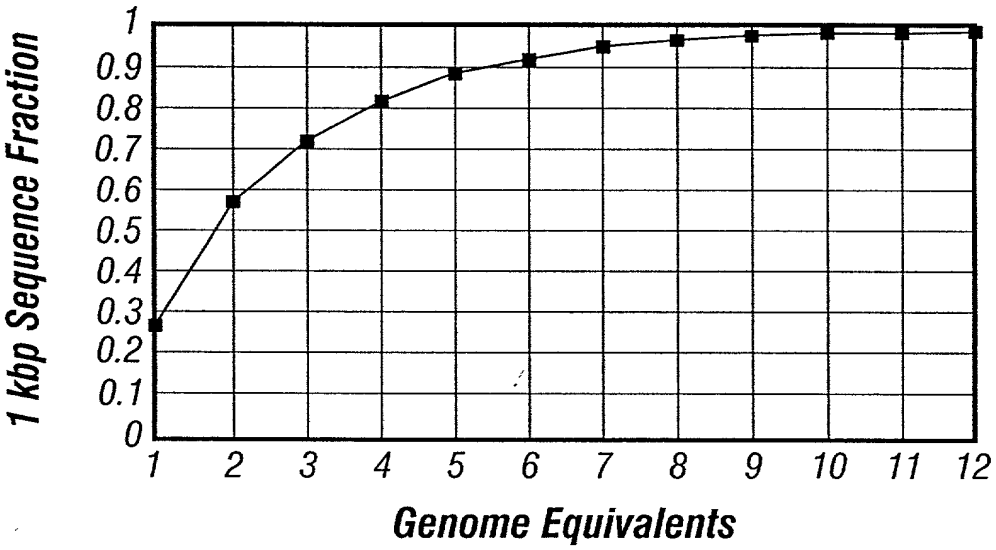

1 kbp Sequence Fraction
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
2
3
4
5
6
7
8
9
10
11
12
Genome Equivalents

FIG. 3

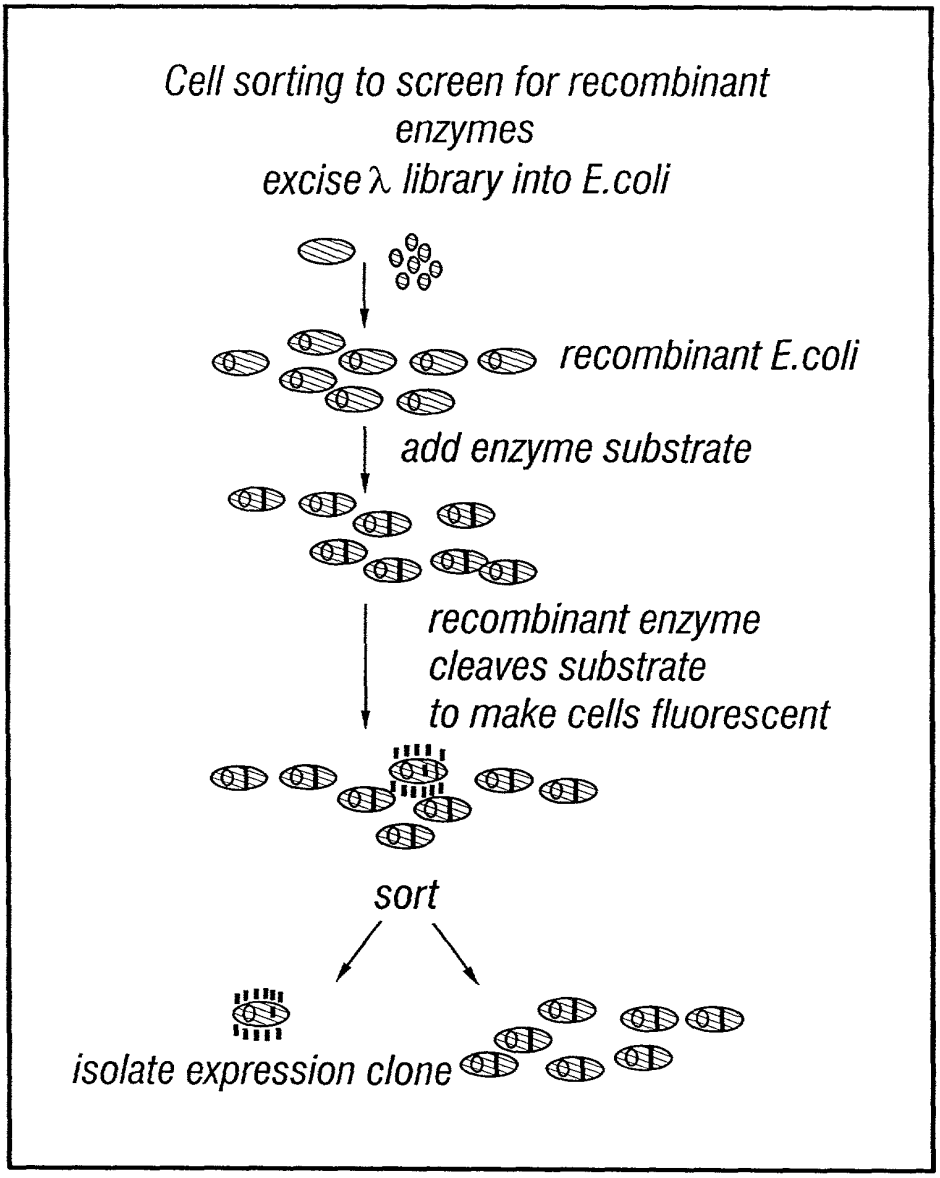

Cell sorting to screen for recombinant enzymes
excise λ library into E.coli
recombinant E.coli
add enzyme substrate
recombinant enzyme cleaves substrate to make cells fluorescent
sort
isolate expression clone

FIG. 4

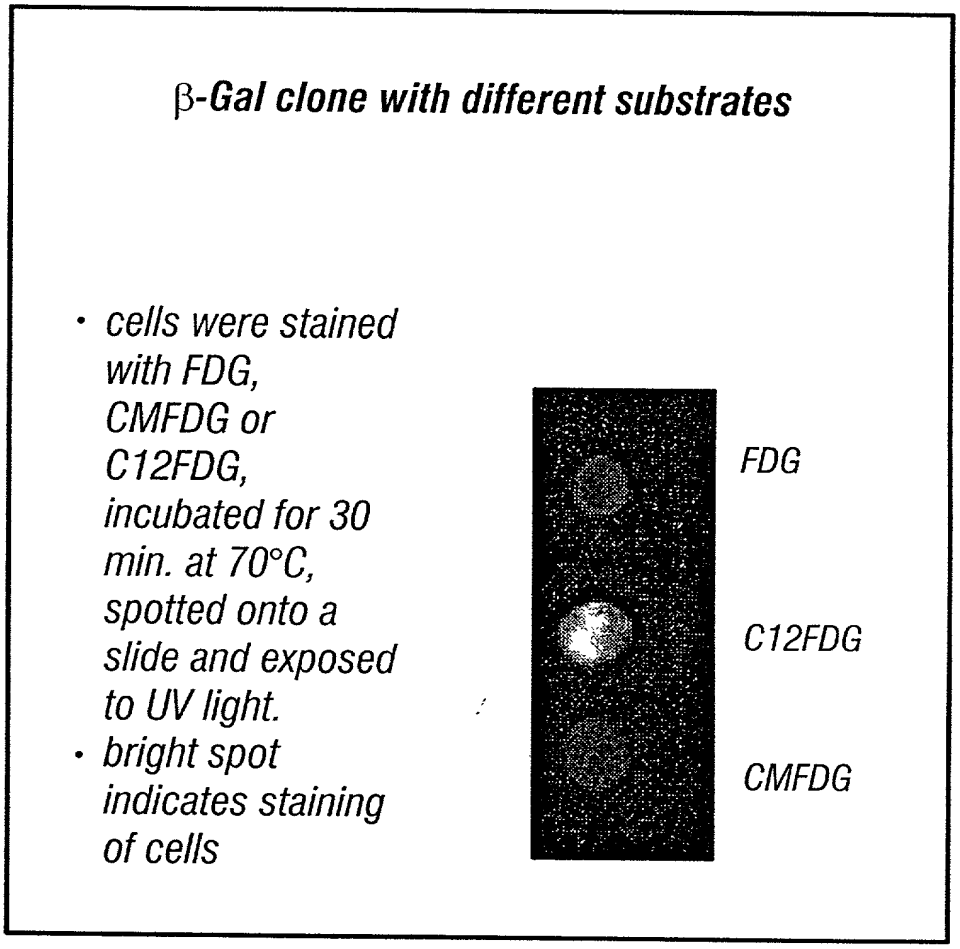


FIG. 5

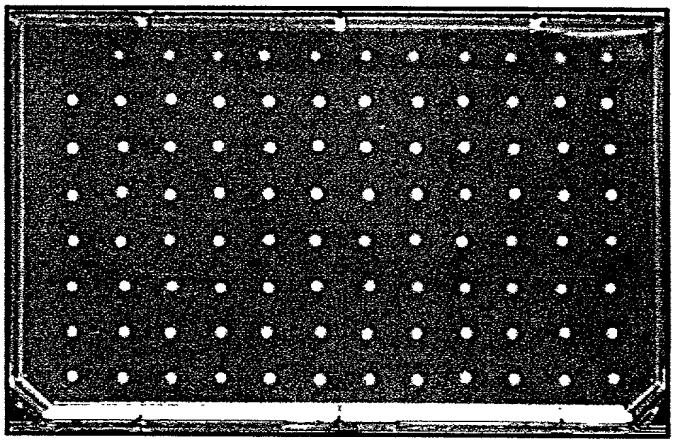


FIG. 6

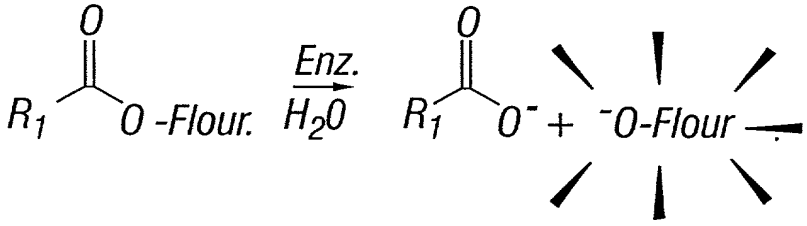


FIG. 7

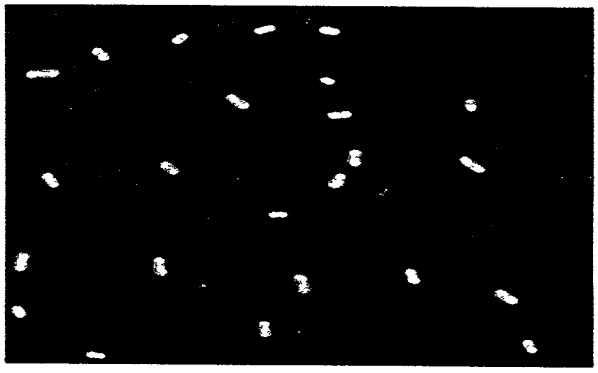


FIG. 8

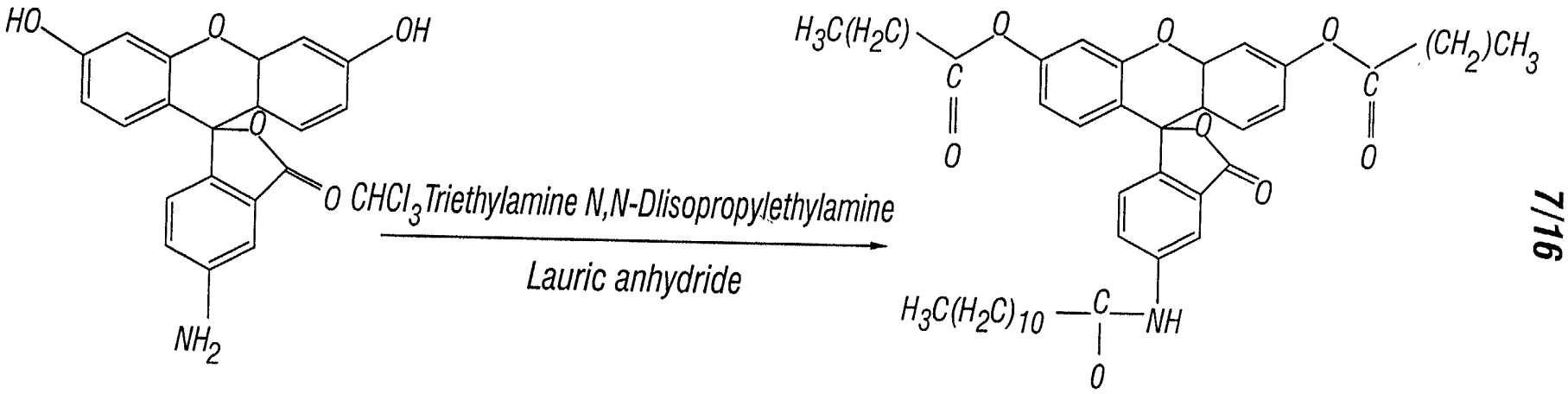


FIG. 9

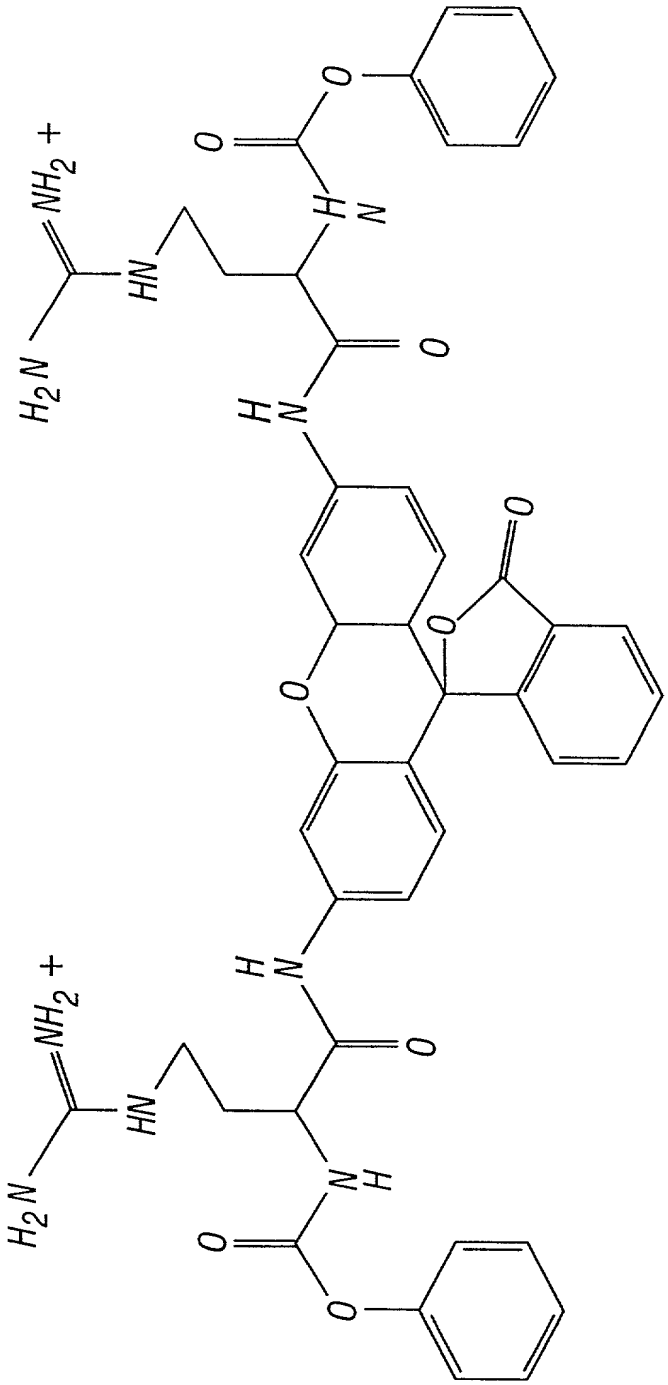


FIG. 10

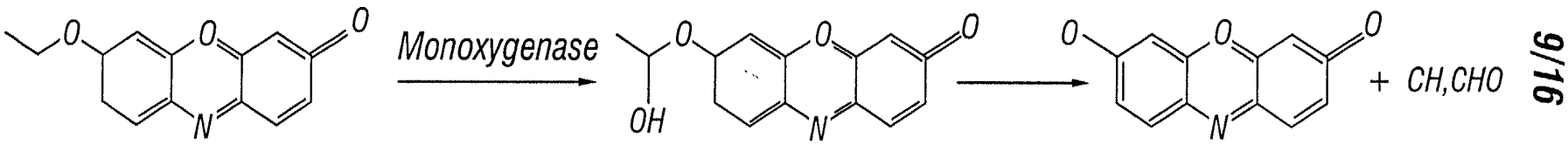


FIG. 11

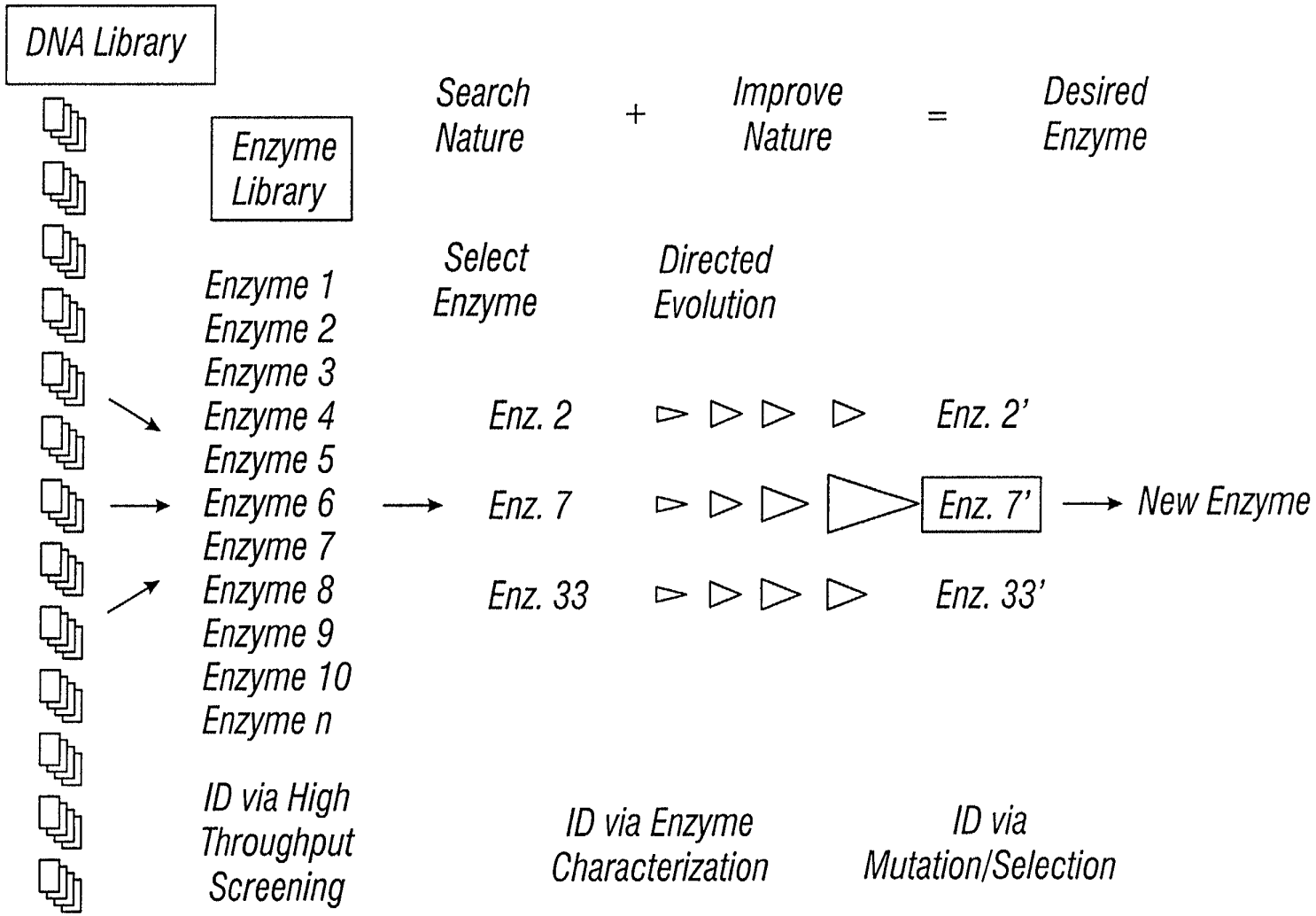

DNA Library
Enzyme Library
Enzyme 1
Enzyme 2
Enzyme 3
Enzyme 4
Enzyme 5
Enzyme 6
Enzyme 7
Enzyme 8
Enzyme 9
Enzyme 10
Enzyme n
ID via High Throughput Screening
Search Nature
+
Improve Nature
=
Desired Enzyme
Select Enzyme
Directed Evolution
Enz. 2
Enz. 2'
Enz. 7
Enz. 7'
New Enzyme
Enz. 33
Enz. 33'
ID via Enzyme Characterization
ID via Mutation/Selection

FIG. 12

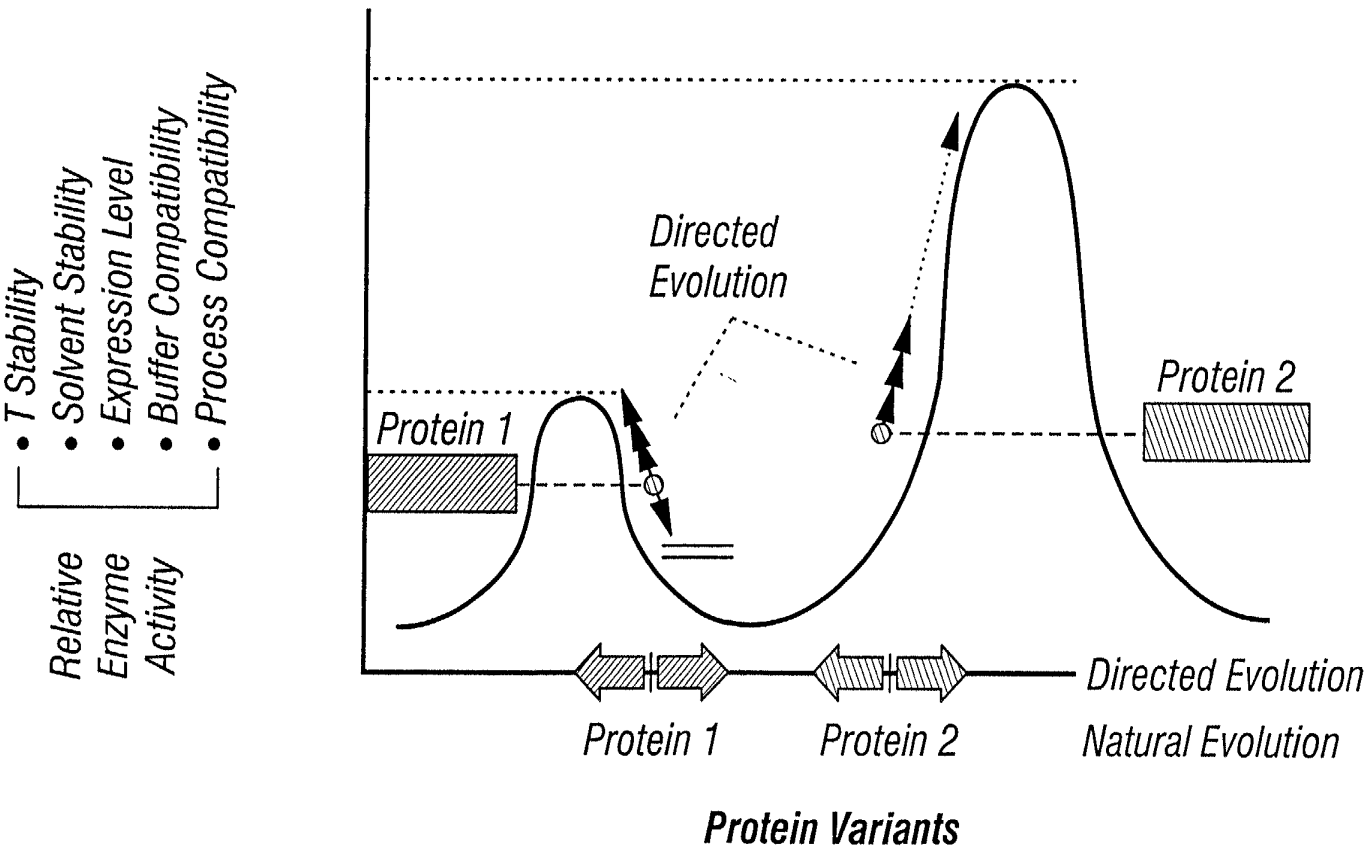
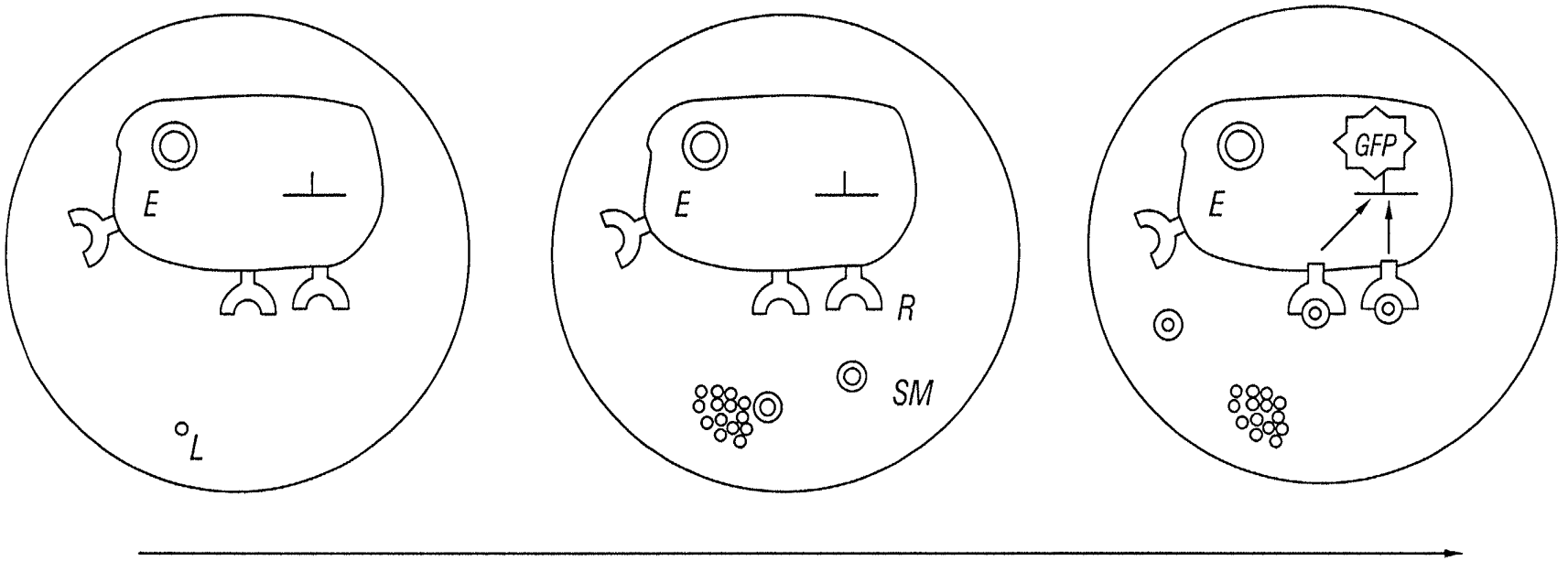

• T Stability
• Solvent Stability
• Expression Level
• Buffer Compatibility
• Process Compatibility
Relative Enzyme Activity
Directed Evolution
Protein 1
Protein 2
Directed Evolution
Natural Evolution
Protein 1
Protein 2
Protein Variants

FIG. 13



Co-encapsulation
Library + Eukaryote

Growth and expression
of small molecule from host

Receptor binding of small
molecule & GFP reporting

E=Eukaryotic assay organism	*L=Large insert library*	*SM=Small molecule*
GFP= Green fluorescent protein	*R=Eukaryotic receptor*	

FIG. 14

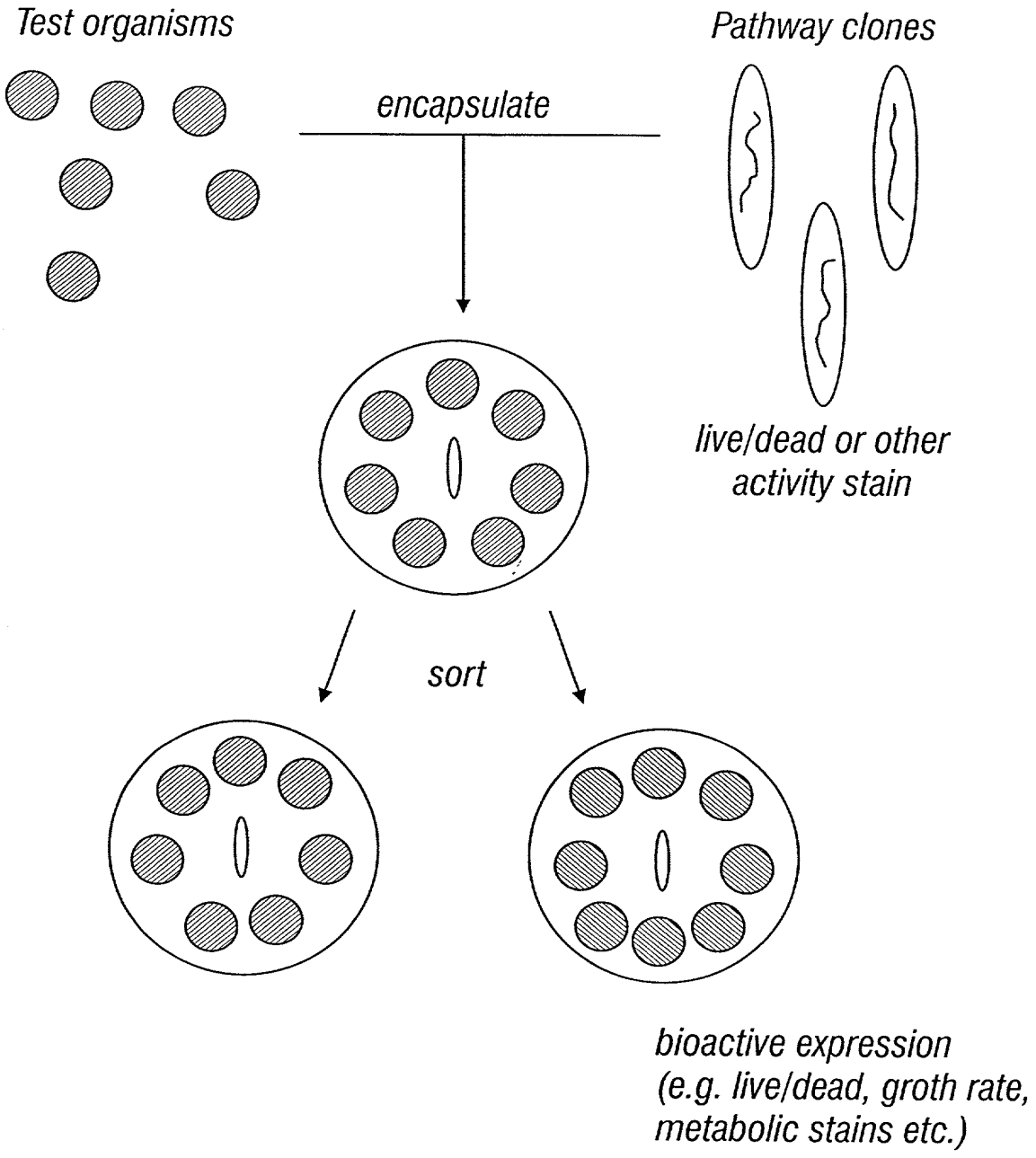
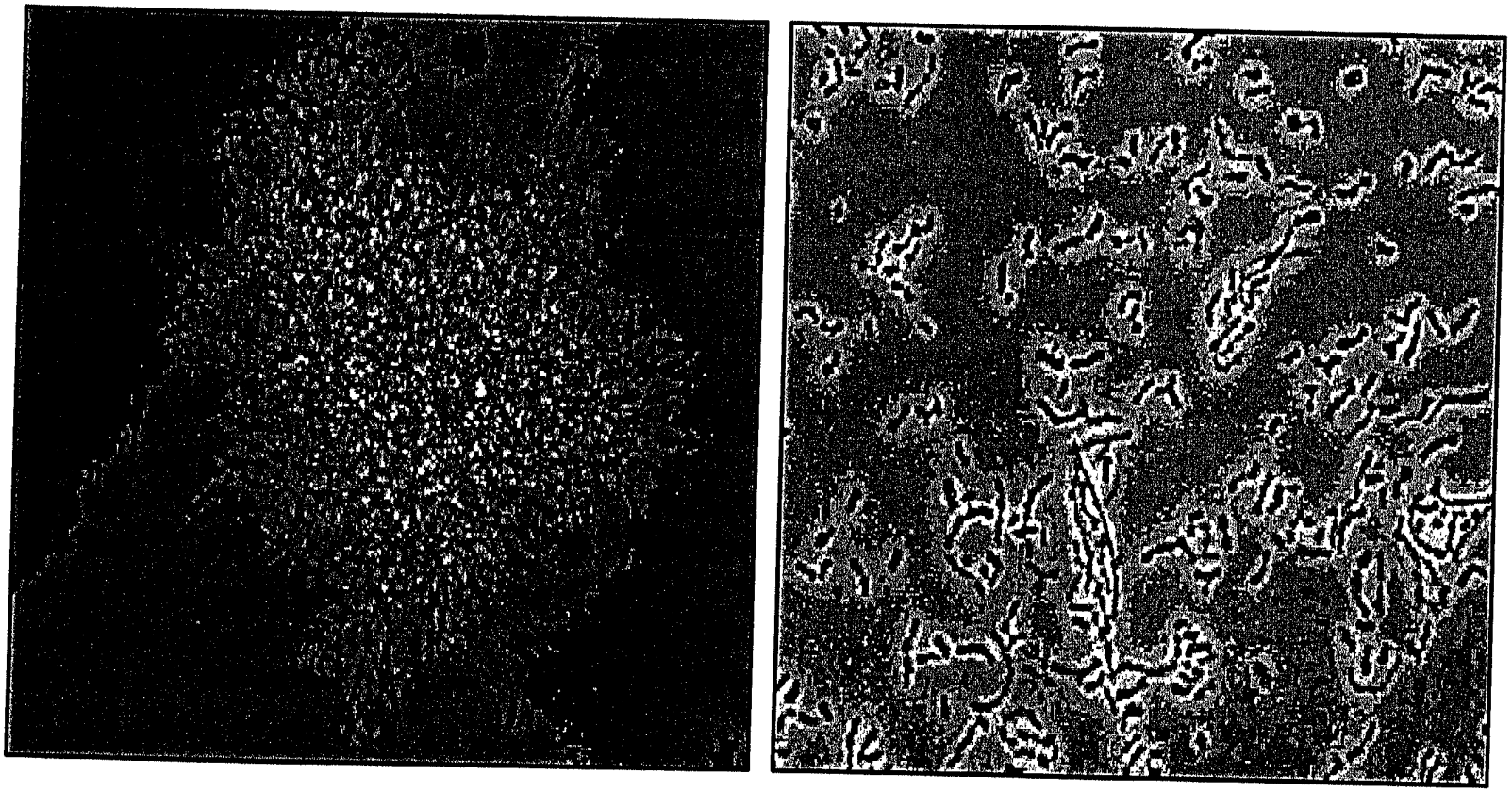

Test organisms
Pathway clones
encapsulate
live/dead or other
activity stain
sort
bioactive expression
(e.g. live/dead, groth rate,
metabolic stains etc.)

FIG. 15



Streptomyces lividans mycelia

Streptomyces "diversa" Unicells

FIG. 16

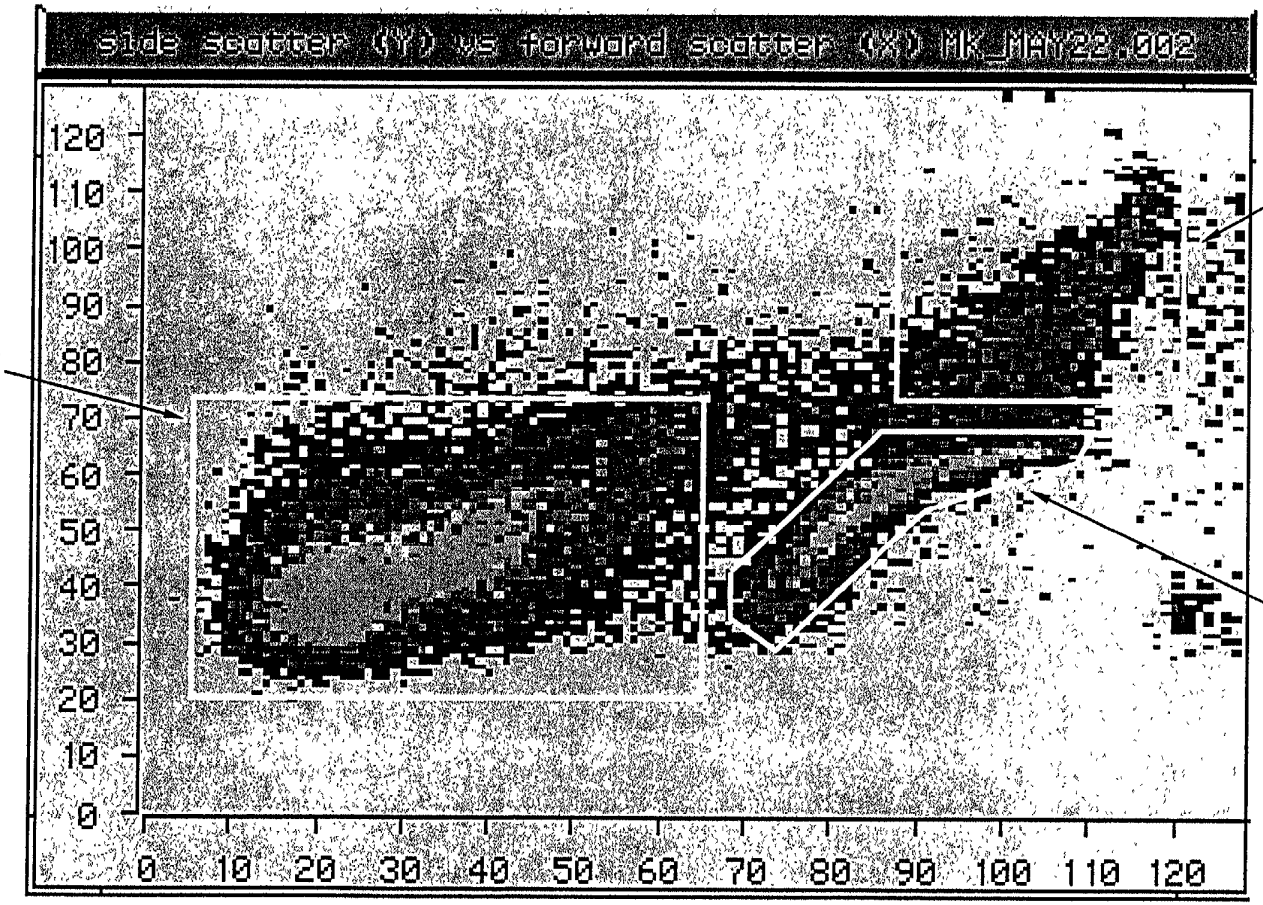


FIG. 17

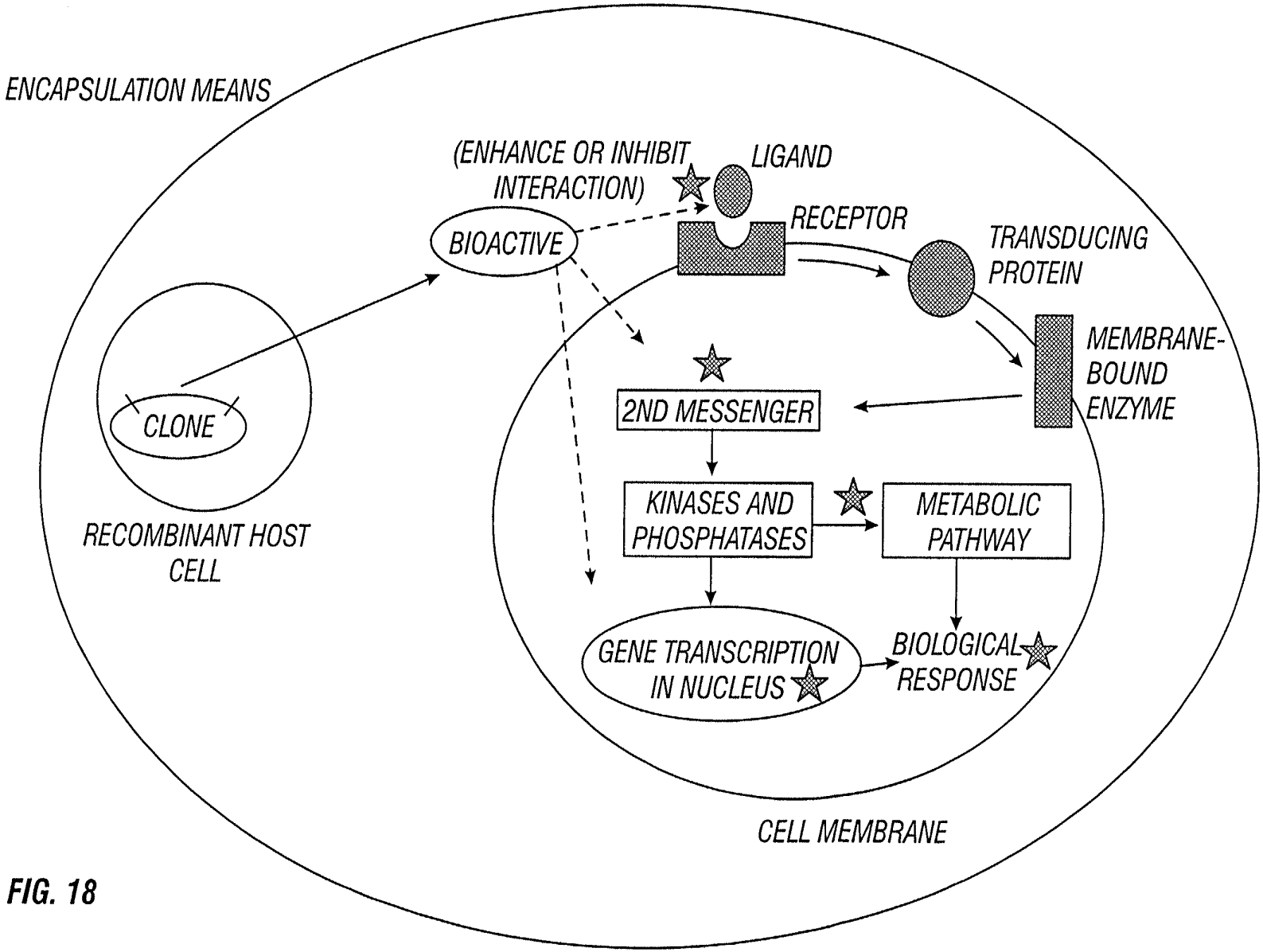

ENCAPSULATION MEANS
(ENHANCE OR INHIBIT INTERACTION)
LIGAND
RECEPTOR
BIOACTIVE
TRANSDUCING PROTEIN
MEMBRANE-BOUND ENZYME
CLONE
2ND MESSENGER
KINASES AND PHOSPHATASES
METABOLIC PATHWAY
GENE TRANSCRIPTION IN NUCLEUS
BIOLOGICAL RESPONSE
RECOMBINANT HOST CELL
CELL MEMBRANE

FIG. 18